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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/003,330	03/11/2002	Hiroshi Takatori	PW 024 9738 P12830	5276

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Pillsbury Winthrop LLP
Intellectual Property Group
Suite 2800
725 South Figueroa Street
Los Angeles, CA 90017-5406

EXAMINER	
AHN, SAM K	

ART UNIT	PAPER NUMBER
2611	

DATE MAILED: 05/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/003,330	TAKATORI ET AL.	
	Examiner	Art Unit	
	Sam K. Ahn	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 January 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,8-13,15-21,23,24,26-28 and 30-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-6,8-13,15-17,23,24,26-28 and 30-32* is/are allowed.

6)☒ Claim(s) *18-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 October 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings were received on 10/21/05. These drawings are acceptable.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hill USP 6,031,428 (cited previously) in view of Roberts et al. USP 6,735,259 B1 (Roberts, cited previously) and Yousefi et al. US 5,448,598 (Yousefi).

   Regarding claim 18, Hill teaches a timing recovery system (see Fig.1) to estimate a phase error (10, also shown in Fig.4, output of 40) and correlate or match (note col.6, lines 50-63) said phase error (output of 40) with a sign of recovered data (first input to 42); filter said correlated phase error by a loop filter to generate an output (14); sum (16) said output with a path output from at least one non-linear path (22,24,26) to generate a summed output (output of 16); and convert said summed output into clock information (output of 20).

   However, Hill does no teach estimating a phase error based on a data sample from both a center of a data eye of input data and from a phase sample from said input data half-a-baud later in time.

Roberts teaches estimation of a phase error based on a data sample from both a center of a data eye of input data (see Fig.2, optimum timing T_{OPT}) and from a phase sample from said input data (delayed version between T- and T_{OPT} or between T+ and T_{OPT}, note col.9, lines 16-28). Therefore, it would have been obvious to one skilled in the art at the time of the invention to implement the step of estimating the phase error of Roberts in the system of Hill for the purpose of increasing the accuracy of the timing recovery of the system (note col.9, lines 11-15). And although Roberts does not explicitly teach that the phase sample from said input data is half-a-baud later in time, Roberts suggests that the clock recovery (4) may generate plurality of clock signals having a unique phase offset (note col.9, lines 17-19). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to implement the phase sample from said input data is half-a-baud later in time. Applicant has not disclosed that the limitation provides an advantage, is used for a particular purpose or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with the phase sample delayed by other unique phase offset because the processor would know the delay between the center of the eye and the clock signal generated by the clock recovery. Therefore, it would have been obvious to one of ordinary skill in this art to implement the invention as specified in claim. And further, although Hill in view of Roberts do not explicitly disclose that the timing recovery system comprises a machine-readable storage medium having a machine-readable program code,

stored on the machine-readable storage medium, the machine-readable program code having instructions to implement the steps above, it is well-known to one skilled in the art to implement timing recovery processes in a computer.

Although Hill in view of Roberts do not explicitly teach wherein the sign is a positive or negative value, applicant has not disclosed that the sign being a positive or negative value provides an advantage, is used for a particular purpose or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with other form to differentiate the sign of the recovered, such as one value higher than the other because assigning the sign to be a positive or negative is not novel, and is merely a matter of designating a value for one and another value for the other to differentiate the two. Therefore, it would have been obvious to one of ordinary skill in this art to modify the system of Hill in view of Roberts by assigning as recited to obtain the invention as specified in claim.

However, Hill in view of Roberts do not explicitly teach monitoring a data density of said input data and generate a data density output.

Yousefi teaches monitoring a data density (**d**, note col.9, lines 42-43) of an input data and generate a data density output (note equation 4, using the data density d in computing for the PLL clock recovery). By considering the data density in the system of Hill in view of Roberts, one skilled in the art would recognize that the PLL operation would improve its performance, as taught by Yousefi (note col.9, lines 62-68). Therefore, it would have been obvious to one skilled in the art at the

time of the invention to incorporate the teaching of Yousefi in the system of Hill in view of Roberts by coupling the input data to the gain control circuit of Yousefi (note col.9, lines 41-42) for the purpose of improving the performance of the PLL operation, as taught by Yousefi (note col.9, lines 62-68).

Regarding claims 19 and 20, Hill further teaches multiplying said correlated phase error by a gain (12 in Fig.1) prior to filtering (14) said correlated phase error by said loop filter.

Regarding claim 21, Hill further teaches summing said output (16) with a non-linear paths to generate the summed output (output of 16). Although Hill does not explicitly teach having three non-linear paths to be summed, it would have been obvious to one skilled in the art at the time of the invention to implement as such for the purpose of increasing the conditions to adjust the phase, as explained previously (such conditions as detection of data pattern, taught by Masenas and accumulated error, taught by Perrott).

Allowable Subject Matter

3. Claims 1-6,8-13,15-17,23,24,26-28 and 30-32 are allowed.

Conclusion

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

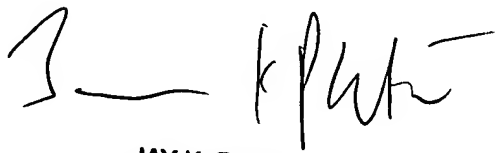
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sam Ahn whose telephone number is (571) 272-3044. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sam K. Ahn
4/29/06



JAY K. PATEL
SUPERVISORY PATENT EXAMINER